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ABSTRACT

The planning, production, validation, and revision of learning materials designed for use in institutes for science supervisors is described in this first of five volumes. Four sets of packages, ("Role of the Science Supervisor," "Introduction to Educational Technology," "An Application of Educational Technology," and "Management Kits,") each using educational technology methods to describe educational technology were produced. They need not be used in a linear manner, but were designed for flexible programing. The materials can be used for inservice development of supervisors, or by them to meet local training needs. Simple media, audio-tape, photographic slides, and written materials were used. "Educational technology" does not mean "use of machines for instruction" but is a "process approach to learning", utilizing learning theory, a systematized approach and various instructional tools to produce learning in individuals. Examples of feedback responses to progress reports sent to supervisors during project development, copies of pre- and posttests given to groups and individuals used for validation, summarized validation results, and operations charts are appended. (AL)

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EDUCATIONAL TECHNOLOGY PROJECT

ED044292

FINAL REPORT

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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VOLUME ONE

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NATIONAL SCIENCE TEACHERS ASSOCIATION
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Office of Education Bureau of Research

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THE DEVELOPMENT OF MATERIALS FOR THE TRAINING OF SCIENCE EDUCATION PERSONNEL IN EDUCATIONAL TECHNOLOGY

Herbert A. Smith
National Science Teachers Association
1201 Sixteenth Street, N.W.
Washington, D.C.

March 1970

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VOLUME ONE

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Dorothy Lutz, secretary, served from the start of the project as a link between all of those involved. She reminded and prodded when necessary and produced consistently and cheerfully throughout.

Clarice Kelley Leslie not only handled identification of all the support information, edited the full report, but also volunteered her time to help complete the final report.

Mary Harbeck reacted, consulted, suggested, and worked to provide considerable professional input as an experienced and dedicated science supervisor entirely on a volunteer basis.

Priscilla Ransohoff created the concepts for Set IV and spent many weekends working with supervisors in making the approach relevant to the supervisor's real world needs. Her professional direction and insights were invaluable.

Layton Mabrey made many creative contributions which are evident in a number of the productions.

Others spent grueling hours of effort and frustration to meet production deadlines, and they surpassed all expectations: Mary McGovern examined and passed on every visual produced, Doug Boyd narrated every tape included in the materials.

Three key men provided conceptual and philosophical continuity, served consistently, and at times courageously, bringing the Project to successful fruition:

Gabriel D. Ofiesh provided direction throughout on the educational technology aspect and assumed responsibility for the entire content input for Set II.

Albert F. Eiss maintained a consistent check on operations and made continuous inputs. He also provided the structure and content for Set III.

George H. Ziener had basic responsibility for the day to day project activities and provided much of the structure for Set IV. He also had basic responsibility for preparation of the final version of all instructional materials and for drafting the final report to be submitted to the United States Office of Education.

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Summary

The National Science Teachers Associations Educational Technology Project developed and progressively defined an assortment of instructional material for use with science supervisors. Continuous revisions were made throughout the development process and all materials were validated to the degree that time and funds permitted. These materials have three major purposes:

1. to develop understanding and initial skills in educational technology,
2. to provide learning techniques and materials that can be used by a supervisor to meet local needs,
3. and to utilize the process of educational technology to teach a working concept of educational technology.

The materials produced are grouped into four sets:

I - Role of the Science Supervisor
II - Introduction to Educational Technology
III - An Application of Educational Technology
IV - Management

Each of the first two sets is composed of a number of instructional packages with each package being an independent unit covering a specific aspect within the et. A complete list of titles included in these packages is at the end of this summary.

These materials have all been validated to some degree through use with science supervisors. The results of these activities provided feedback which formed the basis for extensive revisions of all of the materials. Specific evaluative activities are covered in the body of this report.

These materials can be used on an individual basis, employing individual sets or parts of sets, or as an entire unit. However, the most benefit from use of the full set of materials is anticipated in an institute setting managed on an individualized learning basis. Each supervisor attending the institute would then utilize the project material and select support materials in such a way as to meet his professional needs and background. Interaction with peers is considered vital to the fullest exploitation of the materials developed.

This project produced learning materials. The results of the effort will be successful only to the extent that these materials are utilized and proved to be effective.

The validation effort yielded evidence that the materials have value to science supervisors and should be distributed.

Packages Produced

Set I - Role of the Science Supervisor

1. Curriculum Revision - audio tape/slides and workbook
2. Evaluation - audio tape/slides and workbook
3. Management - audio tape/slides and workbook
4. Public Relations - audio tape/slides and workbook
5. Research - audio tape/slides and workbook

Set II - Introduction to Educational Technology

1. Toward a Definition - Audio tape/slides and criterion tests
2. The Individual Learner - audio tape/slides and criterion tests
3. Learning Pyramid - audio tape and criterion tests
4. Closing the Loop - audio tape/slides and criterion tests
5. Production - audio tape
6. Diagnostic Testing - audio tape and criterion tests
7. Criterion Referenced vs. Norm Referenced Testing - audio tape and criterion tests

Set III - An application of Educational Technology
Total set is composed of a printed interaction workbook.

Set IV - Management
Total set is composed of a Management Systems Kit.

Introduction

This report is composed of five volumes of material. Volume one is the formal project report containing a history, methods of development and rationale, validation activities and results, and conclusions, along with support items as necessary. Volume one, then, comprises the report submission requirements of the project.

Volumes two through five contain the products of the project. Each volume contains one of the four sets of materials developed by the project: instructions, criterion tests, learning content (scripts, simulation information, or kit material) and bibliographic extension material. The production of materials generated during this project is incorporated in these four volumes.

Briefly, this project evolved to meet two distinct supervisory needs in science education:

First) A need for inservice training materials for science supervisors in the area of educational technology.

Second) Skill in utilization of educational technology processes to improve science education programs.

The process of educational technology offers an effective tool for the science supervisor, both in organizing to meet his professional responsibilities and in providing for the improvement of science education programs. Educational technology processes were used to a degree in the development of project materials to meet the above needs in order to provide an exemplary approach to the development of instructional materials. By utilizing educational technology processes, the project produced all materials in a self-contained package format. This approach permits the use of individual packages by the science supervisor to meet local needs. However, the material was developed as a total instructional unit for use in an institute for science supervisors and was grouped into four sets of individual packages.

Set I - Role of the Science Supervisor
(Volume two in this report)

The five packages in this set are designed to orient the science supervisor to his job functions in a very broad sense. They present for the new supervisor a spectrum of activities by which he may structure his own role. For the experienced supervisor they present new areas for his consideration and suggest a reevaluation of priorities. Science supervisors are not told what to do, but they will be given information and motivation for expanding and reorienting their own functions. The packages contained in Set I are:

Curriculum Revision
Evaluation
Management
Public Relations
Research

These materials are all tape-slide presentations with pre-post assessments and utilization directions. Additional bibliographic support material is included which provides for in-depth exploration of the various aspects presented in the packages. As a result, each supervisor is presented with a broad spectrum of supervisory functions along with opportunity for detailed exploration of areas of interest to him.

Set II - Introduction to Educational Technology
(Volume three in this report)

This set consists of three levels of material. Level one has five packages:

Toward a Definition
The Individual Learner
Learning Pyramid
Closing the Loop
Production

All of the packages are tape-slide presentations except "Learning Pyramid" and "Production" which are audio-tape presentations without visuals. The materials on level one are all designed for motivation and initial exposure to the educational technology process. Success of level one material in supplying motivation is measured by the degree of use of level two and level three materials.

Level two consists of two audio-tape packages developed by the project: Criterion Referenced vs. Norm Referenced Testing, Diagnostic Testing, and five commercially available packages. All of the materials on this level are designed to develop initial basic skills and competencies in specific areas of educational technology (formulation of objectives, criterion testing, learning materials design, media, and instructional systems). It is not intended to enable the science supervisor to be a skilled educational technologist; rather the intent is to provide a fairly extensive exposure and orientation to educational technology.

Level three includes additional bibliographic references providing more specific detail than the two earlier levels. This provides the individual science supervisor with in-depth material to meet his individual needs and interests.

There is no claim made that anyone who is able to meet the terminal behavior characteristics of Set II is, by that exercise, a highly qualified educational technologist.

Set III - Applications of Educational Technology (Volume four of this report)

This set consists entirely of printed material. It provides a structure for the science supervisor to use in developing an understanding of a systems approach for the preparation of an inservice program in a local school system. The supervisor is involved in three distinct activities. First, he develops the structure of an inservice program for his own local needs according to the general outline provided. Second, he works through the structure and background of a model inservice institute to provide for implementation of a curriculum stressing scientific literacy. All of the necessary information, curriculum structure, information on participants, and institute structure are included. Third, the supervisor evaluates and revises his own inservice program using the model as a guide.

This set provides the supervisor with practical skills in applying educational technology to meet his own inservice needs. In addition, and perhaps more importantly, the supervisor has a workable systems model which he can use for an inservice program of his own that can be expanded and used in his local school context.

Set IV - Management (Volume five of this report)

This set consists entirely of a management kit. The kit provides the science supervisor with the direction and materials necessary to develop operating system diagrams of his own management activities. As such, it utilizes educational technology in a systems approach to the supervisor's management role. Three distinct outcomes result from this set. First, the supervisor is able to transfer the systems approach to areas other than those presented in Sets II and III. Second, the supervisor develops system diagrams of his actual activities. For most supervisors, this becomes the first visualization of their activities in any systematic way. Third, the supervisor is provided with other systems and details with which he can interact in order to strengthen his own systems.

There is no rigid definable end to this set. It is designed to be open-ended. The supervisor leaves with a series of revised system charts that meet his real needs, but he also has material and outlines for extending the analysis of his charts to any desired depth.

Although the sets are numbered I, II, III, and IV, the order of utilization is flexible as well as the order and use of individual packages within the sets. Development took place in the order listed and the suggested sequence listed represents a logical approach which may be utilized. Appendix A follows the initial operation sequencing and a revised sequence developed as a result of the large group validations,

Methods

The project utilized educational technology to a limited degree as a process in developing the materials. The procedures outlined as follows were generally followed and will be discussed in detail.

A. Specification of Objectives

B. Assessment Criteria for Objectives
C. Specification of Participant Characteristics
D. Development of Learning Sequences (to provide for individual needs)
E. Production of Materials
F. Validation of Materials
G. Revision of Materials
H. Development of a Management System for Utilization of Material

Although this outline was the guide in material development, it must be admitted at the start that it was not always rigidly followed. Variations in approach, however, were not made without conscious decision on the part of the project staff, and were often made due to financial and resource constraints. The process of an educational technology approach to production of materials is, by its very philosophy, a flexible approach that adapts to the needs of the learner. In the process of developing these materials, as much was learned by the project staff as will be learned by those utilizing the material. Many of these ideas and methods will form a part of the conclusions section of this report.

A. Initial objectives for the project were determined through a small study funded by the Office of Education - Bureau of Research (USOE Project No. 7C006, Contract No. OEC-1-7-070006-3789, in 1967, The Use of Educational Technology in Providing Knowledge of Educational Technology and Suggestions for its Application to Science Supervisors). The first step in the present project was the organization of the above objectives into a workable hierarchy developed in terms of the specific backgrounds and needs of science supervisors. From this detailed analysis of objectives, the idea of four sets of materials incorporating the given objectives, along with additional objectives leading to the acceptance of change and the transfer of skills, developed into a broad approach to provide the supervisory competencies required. The sets developed and their basic terminal objectives are: (Objectives in parenthesis are mainly affective in nature.)

> <ins>Set I</ins> - The science supervisor will be able to identify specific areas where his science supervisory activities should be modified or enlarged. The supervisor will seek information in areas where he is unfamiliar. (openness to change)

Set II - The science supervisor will be able to define educational technology in process terms and identify areas within education where it might be applied. (The supervisor will seek to develop skills in various areas of educational technology.)

Set III - The science supervisor will apply the educational technology process in developing an inservice program. (The supervisor will utilize the inservice program he has developed.)

Set IV - The science supervisor will be able to utilize educational technology in other activity areas through development of systems charts for his management functions. (The supervisor will further evaluate and revise his own charts without being required to do so by the project staff.)

Within each set there are a number of specific interim objectives and more expanded forms of the above terminal objectives. These are presented in detail as a part of volumes two through five. Initial objectives chosen at the beginning were not fixed rigidly and the above objectives represent the final product of many revisions throughout the project life.

B. Assessment of the project objectives has and still remains somewhat a source of controversy. Even the most specific objectives cannot always be fully assessed by a paper and pencil exam. This is especially true of affective objectives. Project validation activity has led to significant changes in staff approach to the use of criterion tests (or assessments). There are three different assessment methods for use with the project materials. If the project materials are used in their entirety, then the criterion assessment included in Appendix D should be used. Participants going through all of the packages will complete a number of specific assessments.

The assessment above, however, represents a general total assessment in both attitude and specific understanding. Although all of the individual tests give a more complete picture of the learning produced by the individual packages, the validation activities showed that participant motivation is inversely proportional to the number and length of written criterion assessments given. This, however, in no way vitiates the importance of these kinds of data in acquiring the necessary developmental guidance needed. It seemed obvious that a learning system designed for mature and sophisticated participants concerned with high level professional performance requires some adaptation of generally accepted educational technology theory.

The second type of criterion assessments are the individual tests provided with each individual package within the sets. These tests were utilized in the validation activities and during the development of the individual units. The final criterion assessments are not available in a written format similar to the other two types since they deal with affective objectives. Some of the attitudes developed were identified through the individual assessment sheets, Appendix D, used during the validation activities. Full attitude assessment requires a series of follow-up activities as well as implementation of the complete project materials in the proposed institute.

C. Specifications of participant characteristics were initially outlined in the project proposal, i.e., science education personnel. Included within this very broad designation are personnel whose major responsibilities involve the science program, its development and implementation, and the teaching staff necessary to carry out the science program. This activity may be carried out within individual schools, intermediate units, or on state levels. Titles for this type of person range through Supervisor, Science Department Head, Science Advisor, Science Consultant to Science Administrator. Although the materials are designed for this group, by their flexibility of application, many of the packages produced will be applicable outside of the original population group. Certain background was assumed such as a college education, experience in science education, awareness of the general functions of a science supervisor and knowledge of the structure and operation of the existing science education program. Other student characteristics such as specific background knowledge and skills are less critical in the design activity since utilization of the materials produced will vary according to the participant's experience, interests and learning needs.

D. Development of Learning Sequences began with Set I and was a continuing process of feedback and revision between the initial terminal objectives and realistic content preparation. Set I was broken down into five basic science supervisory responsibilities: "Curriculum Revision," "Evaluation," "Management," "Public Relations," "Research." These areas do not cover the entire scope of a science supervisor's activity, but they do comprise the most important and time-consuming areas. Realistic limitations of time, staff and funding necessitated compromises in idealized objectives. Similarly, Set II materials could (and possibly should) include many more aspects of the educational technology process than are present in the final material. In Set II, in order to provide for certain areas that could not be produced, commercially available materials are utilized. In addition, due to project limitations in production, commercial materials were included for practical reasons--both to provide additional depth and comprehensiveness and to avoid unnecessary duplication. Where available materials could be identified as effective means to the defined learning ends, they were used. Sets III and IV required less use of commercial material because of their open-ended and self-initiating structure. In both cases it was decided that skill development necessary to meet the terminal objectives would come most effectively (both cognitive and motivational) from a discovery type of approach. The supervisor uses the cognitive knowledge developed in Sets I and II to meet specific needs structured into Sets III and IV. The learning sequences for the last two sets were developed on this basis and, as a result, are interactive rather than passive presentations. Although only a single linear learning strategy was developed for each set, individual learning needs tend to be met in actual application because of the built in flexibility and open-endedness and through the use of the available commercial materials that have been identified.

E. Production of materials was based on very realistic assumptions. It would be ideal to utilize a broad spectrum of mediated materials in order to expose the science supervisor to the best possible uses of media. However, local use of the produced material would be limited to areas and districts where more advanced media hardware is readily available. In addition, the cost per hour of production of sophisticated media is quite high and does not really justify the desired learning outcomes. Media were chosen for ease of utilization, applicability and ease of production. All of the materials fall into one or more of the following four formats: audio tape and slides; audio tape alone; printed material; and a manipulative kit (or game). In this way, a variety of easily usable material has been produced. Further sophistication could be introduced through interaction or assessment materials produced in eight or sixteen millimeter film format or on video tape.

Another consideration for the choice of simple media usage is the participant learning characteristics. Exotic, nonprint media may inhibit rather than enhance communication with more traditional science supervisors. As in the choice of linear development for the learning sequences, variety of implementation is achieved through flexible utilization of the material.

F. Validation of Materials was the most important activity in the entire project. The materials were evaluated and revised a number of times prior to production by the project staff and by science supervisors brought in as consultants. This activity eliminated some of the more obvious problems in both content and style. After production, materials were presented as individual packages to individual supervisors. Their responses to the pre-post tests as well as their comments were used as the basis for further revisions in both audio and visual content prior to the two large group validations.

Two large group validations were held, one in West Palm Beach, Florida, (December 1-5) with twenty science supervisors attending, and the second at Dickinson College, Carlisle, Pennsylvania, (January 5-9) with eleven science supervisors and college faculty attending. In both sessions all of the project material developed was presented without the use of any of the commercially available items. The first session (Florida) received the material in numerical order--Sets I, II, III, IV--and were given pre-post tests for all items presented. The results were positive for the material and strongly negative on both the testing and order of presentation. As a result, the Pennsylvania session had a changed order of presentation and far fewer pre-post tests. Programs for both sessions, sample response sheets, and a brief summary of results are included in Appendix E. Set II materials were also presented as a unit to science supervisors in Boston on December 8, 1969. Various packages have also been presented to science supervisors participating in a science education seminar at the University of Maryland. Summaries of the Florida and Pennsylvania sessions are included in Appendix E.

The amount of validation on individual units varied depending upon the project production schedule. Some of the later sections, as indicated on the chart on the following pages, were not included in the large group validation sessions. The chart following, summarizes the validation activities. All of the final products submitted with this report have been carefully revised on the basis of the validation information. However, the revised material has not been validated. It must be emphasized that although fairly extensive validation has been carried out on most of the material, more rigorous validation and more extensive field testing are necessary on both the pre-post tests and the materials, especially as a complete unit including all peripheral materials. There is a limitation to this activity, especially in the assessment instruments, because of the population using the materials. As relatively experienced professionals, science supervisors do not react favorably to the frequent and detailed assessment sessions necessary for rigorous validation. Individual reactions to single packages or sets indicate strongly that large group utilization of the materials in an institute would lead to attainment of the objectives, both cognitive and affective. Ultimate validation, of course, will only be realized when the full array of materials is used in an institute of the type for which the complete set of materials was designed. Feedback from such an effort will suggest the degree of validity of the materials, and, perhaps more importantly, provide the inputs for further modifications and revisions.

G. The revision of material, as has already been mentioned, was a continuing process responding to validation feedback. Revision was based on responses to content and the accompanying attitudinal posture. Failure in effective communication of content leads to decreased learning; improvement of learning outcomes was the major objective in revision of project materials. However, positive interest and motivation were also vital considerations for revision. If the affective response is so negative that the participant rejects the rest of the program, changes in content and approach were obviously indicated. Cognitive and affective objectives are conceived as basic components in all materials produced.

VALIDATION ACTIVITY

PACKAGE	STAFF REVIEW	INDIVIDUAL SCIENCE SUPERVISORS	LARGE GROUP FLORIDA	LARGE GROUP PENNSYLVANIA	LARGE GROUP BOSTON	LARGE GROUP UNIVERSITY OF MARYLAND
Curriculum Revision	X	X	X	X		X
Evaluation	X	X	X	X		X
Management	X	X	X	X		X
Public Relations	X	X	X	X		X
Research	X	X	X	X		X
Set I As a Unit	X	X	X	X		
Toward a Definition	X	X	X	X	X	X
The Individual Learner	X	X	X	X	X	X
Learning Pyramid	X	X			X	X
Closing the Loop	X	X	X	X	X	X

PACKAGE	STAFF REVIEW	INDIVIDUAL SCIENCE SUPERVISORS	LARGE GROUP FLORIDA	LARGE GROUP PENNSYLVANIA	LARGE GROUP BOSTON	LARGE GROUP UNIVERSITY OF MARYLAND
Production	X					
Diagnostic Testing	X					
Criterion Referenced vs. Norm Referenced Testing	X					
Set II As a Unit	X					
Set III - Part One	X	X	X	X		
Set III - Part Two	X	X	X	X		X
Set III - Part Three	X	X		X		
Set III As a Unit	X	X		X		
Set IV	X	X	X	X		X

All of the material has been revised a minimum of two times after the first "final" production as a result of staff and individual supervisor evaluation. Revisions were made after each validation activity shown on the chart on pages 11 and 12. Final revisions, both in content and style, were made just prior to this final report. These revisions, like validation, are not "final" in the ultimate sense. However, the materials do represent a finished product applicable in their present form for use with science supervisors.

H. Development of a management system for utilization of material is a key step in implementation in the educational technology process. Until the large group validations, any management plan was largely theoretical.

A basic tenet of educational technology is that a management system focuses on the individual learner. The system is structured to make full use of the materials available in such a way that the individual attains the specified objectives.

Knowledge of the learner characteristics involved enabled the staff to develop an initial plan which utilized the materials in sequential order supplemented by additional peripheral material (chart in Appendix A, page 24).

After the first large group validation, serious problems in regard to the appropriateness of the originally conceived sequence were discovered. The utilization of material not only needed to be more flexible, but most participants needed a better understanding of educational technology before using any of the Set I material. This need for early understanding of educational technology as a process was re-emphasized in Pennsylvania where everyone conceived of educational technology as machine applications to learning. As a result, there was semantic confusion everytime the term was used. The final system proposed (Appendix A, page 25) incorporates changes indicated by the validation experiences.

To the best of available knowledge, the management system used for implementing the project materials in an institute provides an optimum approach to meeting individual participant needs within the limitations established by the amount of both project and commercial material available.

A fully complete validation of the system must wait until it can be tested through actual use under conditions basic to the original conception of the project. As with the materials produced during the project, the system does represent a functional product based on a fairly high degree of actual objective experience using the processes of educational technology.

Results and Findings

The accompanying volumes, two through five, incorporate the results of this project. In brief, the results are a complete series of refined, mediated material usable for inservice training of science supervisors.

If the materials remain as they are in this report, items to be read, rather than materials to be experienced and shared by intense interaction with peers, the project materials will fail to achieve the intended objectives. These materials have been developed and produced to be utilized with and by science supervisors. The degree of utilization may vary with individual packages, but all of the packages must be used if the original objectives inherent in the project are to be realized.

Conclusions and Recommendations

Product:

1. The project was successful in producing a series of usable materials for science supervisors both for inservice development of the supervisors themselves and for use by supervisors to meet local training needs.

2. The materials, although they have not been as rigorously validated as educational technology might demand, do represent a high degree of sophistication as a result of revisions based on both cognitive and affective changes in science supervisors who have used the material.

3. From the reactions of science supervisors, administrators and others who have used the materials, the sets appear to have a general utility potential to meet the needs of all supervisors and should be revised to enhance their interdisciplinary applicability.

4. The materials are of such a nature that final validation requires implementation of all sets in an actual operating institute. Final revisions of the materials, tests, and management system should be made on the objective results obtained from the operation of such an institute.

5. Full capitalization from the effort, time, and money invested in this project will depend on the utilization of the materials produced. The project was a practical activity leading to a usable product rather than a data gathering research investigation.

Process:

1. A project staff consisting of science educators, educational technologists, artists, and technicians had at the start characteristic and basic interdisciplinary communication problems. The working combination with contrasting philosophies and skills resulted in personal development of all staff members in addition to a successful development of materials. However, future projects involving a cross disciplinary team of this type could profit from the inclusion of at least one generalist in all of the above fields in an administrative capacity.

2. Use of science supervisors as consultants interacting with materials as they are developed provides valuable revision information before presentation formats are fixed. It was found, however, that it is necessary to have evaluation based on the actual mediated material rather than in their printed form since the results are significantly different.

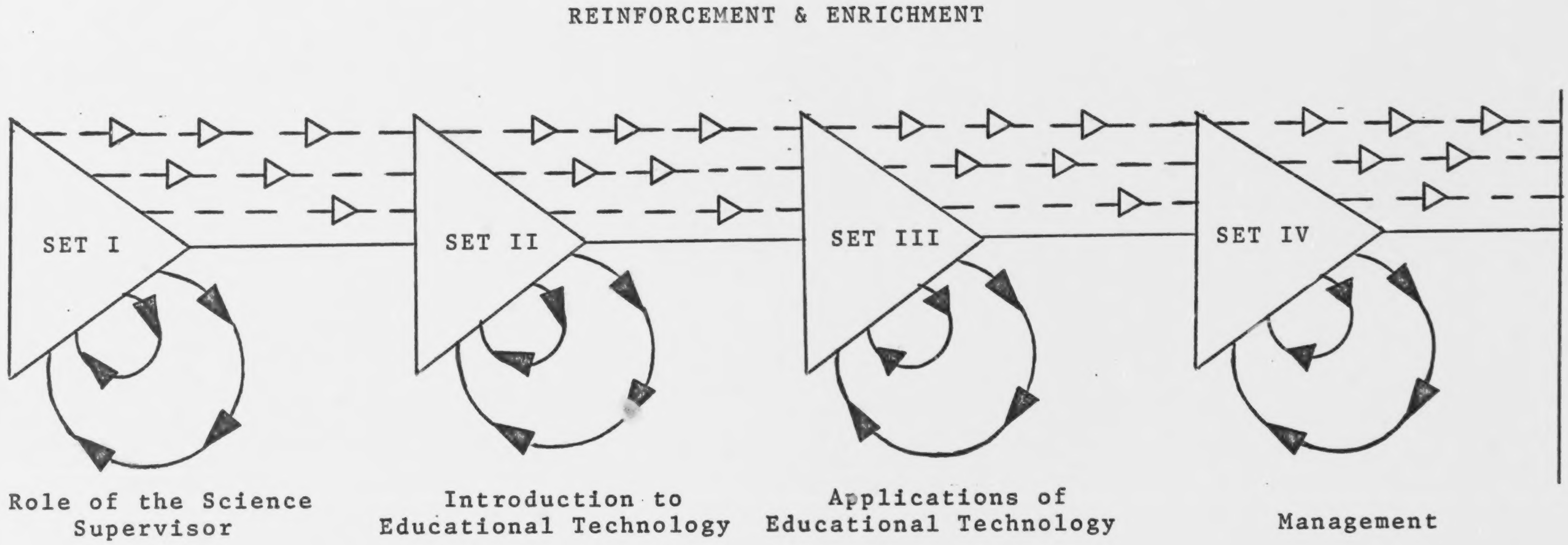
3. The use of simple media provided a number of unanticipated bonus factors: material could be easily revised; supervisors were not conditioned to linking machines with educational technology; and production costs and time were considerably less than with highly complex media allowing for more materials to be produced.

APPENDIX A

OPERATIONAL CHARTS

INITIAL/REVISED/JUSTIFICATION

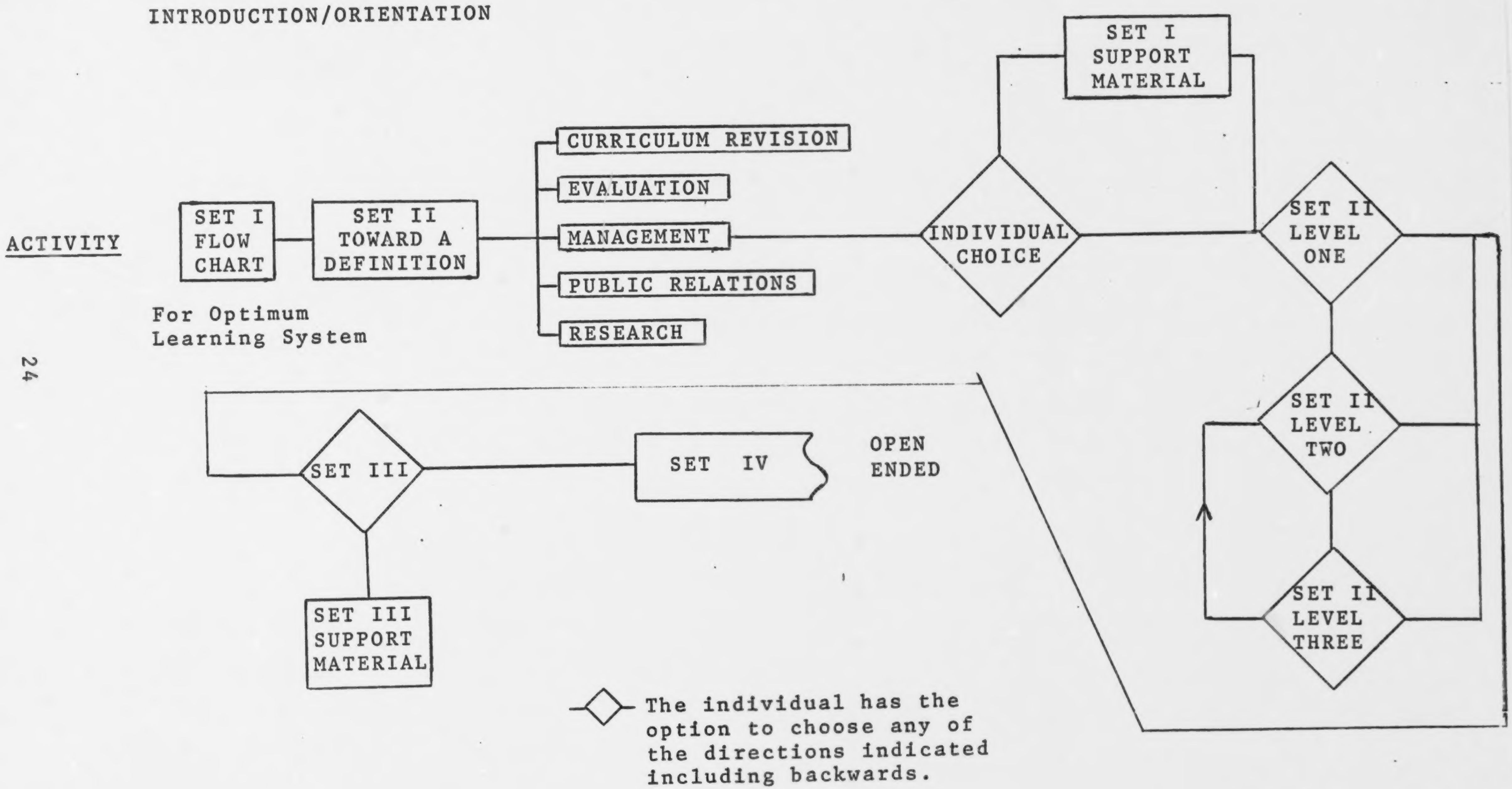
INITIAL OPERATION CHART


REINFORCEMENT & ENRICHMENT
SET I
SET II
SET III
SET IV
Role of the Science Supervisor
Introduction to Educational Technology
Applications of Educational Technology
Management

NOTE: Critical Path Material consists of all packages within each set.

Support material (outside of the sets) is of two types:
- a) Reinforcement and Enrichment - expands and extends instructionsl areas within a particular set.
- b) Reinforcing - alternate material utilized to aid participants in completion of a set.

REVISED OPERATION CHART



The individual has the option to choose any of the directions indicated including backwards.

JUSTIFICATION

During the first large group validation, it became obvious that the sequential method shown in the initial operation chart might result in cognitive learning gain but might also result in negative affective change. There are, however, two reasons, aside from the structure, that caused this. First, the presentations were made on a group basis. Second, the validation included use of the pre-tests before each presentation and post-test after.

The presentation structure for the second large group validation (Carlisle, Pa.) changed the structure in directions requested by the first group (Florida)(chart not shown). As a result of these two activities and the arrangement of Set II's present structure (diagram was not completed in time for the second large group validation) the chart shown on the previous page represents the revised operation chart.

Although each set and each package within a set is an independent self-contained entity, the entire sequence of sets comprises a gestalt which requires structure of an operating system that will provide optimum affective as well as cognitive gain. In addition, participants entering with a concept of educational technology as machine application found considerable difficulty until they were presented with an operating definition based on process.

Introduction and orientation sequences were chosen with the above needs in mind: The Set IV kit has received consistant favorable response and represents, by its early use, a unifying link through all of the sets, developing a positive attitude. The choice of Toward a Definition as an educational technology orientation was made because the participant finishes that package with a working definition of educational technology as a process.

The remainder of the diagram is a visual description of a learner's progress through the materials. With the guidance provided by the pre-post assessments, and an understanding of his own needs, the participant is free to utilize any or all of the material.

APPENDIX B

PROGRESS REPORTS

CLIPPINGS

CONTINUING PROGRESS REPORT NO. 1

EDUCATIONAL
TECHNOLOGY
PROJECT

Continuing
Progress
Report
no. 1
Feb. 1969

NATIONAL SCIENCE TEACHERS ASSOCIATION
1201 Sixteenth Street, N.W., Washington, D. C. 20036
Area Code 202–223-9400

This is the first in a series of Continuing Progress Reports on the National Science Teachers Association Project officially titled

> "The Development of Materials for the Training of Science Education Personnel in Educational Technology."

but for convenience to be referred to as: Project in Educational Technology. Copies of this report and subsequent issues may be obtained from the project office. There will be a charge for these reports—*feedback.* Space is provided for comments – reactions, suggestions, and questions. Two copies will be sent for each request so that one can be returned with feedback for the project staff.

PURPOSE: This project has been designed to meet a number of needs centering around the interaction of science supervisory activities and Educational Technology applications. The terminal product will be a number of validated, self-instructional packages in four areas designed to meet specific objectives for science supervisors.

The material will be arranged in four sets of modules, two directed toward orientation and two toward implementation.

Set A – Functions of Science Supervisors–(Problem Identification)

Set B – Function of Educational Technology–(Learning Systems Theory)

Set C – System Applications

Set D – Administrative Activity–(Management)

Each module will contain a number of self-instructional units based on specifically stated objectives. As a part of the project, each of these units will be structured, produced, tested on supervisors, and revised. Continuing interaction with science supervisors will be maintained throughout each phase of the project, as well as during the validation activities.

OBJECTIVES:

1) To define the role of the science supervisor.
2) To identify problems within these functions that can be met through the application of Educational Technology.
3) To produce validated instructional material that will enable supervisors

FEEDBACK

to identify their own specific problems and to structure possible solutions.

4) To produce validated instructional material that will help supervisors develop skills necessary to utilize Educational Technology in instruction and management.

PLAN: The specific activities of the project have been projected using a PERT type format and may be outlined in the following way:

1) Identifying specific Objectives for modules and structuring Criteria Tests to measure attainment of the Objectives. (What outcomes are desired and how can they be measured?)

2) Development of Pre-Test and Assessment. (What attitudes, backgrounds and concepts of their functions supervisors do have at the start of a module)

3) Specify and sequence Enabling Objectives for the module. (In detail, what steps must be taken to reach the desired outcomes?)

4) Develop the instructional packages.

5) Evaluate and revise the packages.

(Continue on other side if you need more space.)

THIS PROJECT IS FUNDED UNDER A RESEARCH GRANT FROM THE DEPARTMENT OF HEALTH, EDUCATION AND WELFARE–OFFICE OF EDUCATION. TITLE IV–PROJECT #8-0427.

DIRECTOR:

HERBERT A. SMITH, PHD.
Associate Dean for Education
Colorado State University

CHIEF CONSULTANT

GABRIEL D. OFIESH, ED.D.
Director, Center for Educational Technology
Catholic University of America

NSTA REPRESENTATIVE

ALBERT F. EISS, PHD.
Associate Executive Secretary
National Science Teachers Assoc.

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EDUCATIONAL
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PROJECT

CONTINUING
PROGRESS
REPORT
no. 2
June 1969

NATIONAL SCIENCE TEACHERS ASSOCIATION
1201 Sixteenth Street, N.W., Washington, D.C. 20036 Telephone: Area Code 202 223-9400

PURPOSE OF THE CONTINUING PROGRESS REPORT

The first report was prepared as a brief introduction to the NSTA Project in Educational Technology. Each successive report will try to fill three general purposes:

1. Expand in greater detail on some area of the project.

2. Report on the progress of project activity.

3. Provide a response to the feedback received as a result of the previous report.

We could call it a newsletter, but it is designed to be more of a briefing and a report for those interested in the Project rather than a set of news articles. Each report will contain a 'feedback' section which will fold into a prepaid, pre-addressed mailer. The information, reactions, and requests that are received have a very real purpose. They show us the degree of interest in this project from a number of areas and they also help to prevent our losing continuous contact with the science personnel who are going to be the ultimate users of the materials we are trying to produce.

The Progress Report is sent without charge, cost, or obligation to anyone who indicates an interest in the project. The feedback section provides a place to indicate whether or not you want to continue receiving these reports and another place for your name and address (with Zip Code).

Everyone receiving the Progress Reports either has an interest in the project (at least to some degree) and reads the report or couldn't care less and dumps it in a circular file. We would prefer to eliminate the latter from the mailing list - it will save paper.

INVOLVEMENT

The only way the Project staff can keep from becoming isolated in its own activity is to continuously interact with science education personnel. The Progress Reports provide the project with a means of talking about itself. The 'feedback' form provides people interested in the project with an easy method of reacting and requesting. In addition, as material is developed, we hope to send out for trial and evaluation these packaged units. The only way to find out if the material works is to try it out and on the basis of these trials revise and refine it in order to better attain the project objectives. Some people have already offered to work with us on this level and we intend making full use of this type of interaction.

Your interest is enough to keep you on the mailing list - further interaction and participation is not necessary but will never be refused. As a side point - we need negative as well as positive reactions, whether anonymous or signed, but we find it difficult to send return letters to anonymous writers.

RESPONSE TO SUGGESTIONS

Reactions to the first of the Continuing Progress Reports were on the whole - favorable. The 'feedback' provided did determine the structure of this report which is designed to:

A. Provide in greater detail specific outcomes desired for for the project.

B. Define some of the vague terms found in the first report - keeping 'pedantic jargon' to a minimum.

C. Specify in detail the purposes of the Progress Report.

D. Specify the role we would like those receiving the reports to have in the project.

E. Present the present status of project activity.

STRUCTURE

The full title of this NSTA Educational Technology Project is "The Development of Materials for the Training of Science Education Personnel in Educational Technology." The general goals of the project are well stated by the full title.

The materials being developed have been grouped into four basic areas or Sets.

SET I - ROLE OF THE SCIENCE SUPERVISOR
Presentation of the broad activities of the Science Supervisor/Consultant seeking a positive attitude toward reevaluation and possible extension of the supervisors present activity.

SET II - INTRODUCTION TO EDUCATIONAL TECHNOLOGY
Offering an operating definition for Educational Technology and an exposure to the process and methods.

SET III - APPLICATION OF EDUCATIONAL TECHNOLOGY
Development of understanding and skills necessary to utilize Educational Technology in preparation of a learning system.

SET IV - MANAGEMENT
Transfer of the skills developed in the previous set to other supervisory areas such as budget preparation, proposal preparation, and other management areas.

These areas or Sets are slightly different in wording from the first Progress Report and represent a refinement in our thinking. Greater expansion on what specifically is to be done in each set will form the major content of the next progress report.

PLANNED OUTCOMES

Each of these sets will be composed of a number of self-contained instructional packages containing specific (behavioral) objectives, criterion tests, learning materials (books, slides, audio tapes, or whatever format used), and instructions. In addition to the basic instructional packages being developed for each set, there are two types of supporting material being prepared. For the most part this supporting material represents already available 'off-the-shelf' items which will serve to represent different content or to extend in greater depth specific content areas within a set.

As far as possible, all material will be self-instructional in nature and can be used by an individual or small group. Each package as it is developed will be tried out (validated) on science supervisors and revised on the basis of whether or not it accomplishes its stated objectives. Each package will be validated and revised individually - the entire set will be validated and revised as a unit.

These validated and revised materials are being designed specifically for the Science Supervisor/Consultant. Since each individual package is self-contained and meets specific objectives, there will be a considerable amount of material that s supervisor can use in work within his local area. For example: A package on evaluating and preparing instructional (behavioral) objectives, although it is written for the Supervisor, will most likely be useful for the teacher within a local school.

DEFINITION OF TERMS

Science Education Personnel - We are preparing materials specifically for Science Supervisors. Within this very broad designation, we include personnel whose major responsibilities involve the science program, its development and implementation, and the teaching staff necessary to carry out the science program. This activity may be carried out within individual schools, intermediate units, or on state levels. Titles for this type of person range through Supervisor, Science Department Head, Science Advisor, Science Consultant to Science Administrator. Although the materials are designed for this group, by their very nature many of the packages produced will be widely applicable outside of the original population group. In some of our initial validation activity, classroom teachers were involved.

Self-Instructional Packages - These are complete learning packages containing full implementation and evaluation information and a multi-media learning presentation. They are designed to be used either by an individual or small group without the need for a leader or instructor being present.

Educational Technology - It is a process approach to learning that utilizes learning theory, a systematized approach, and instructional tools from human to machine developed to produce specified learning within an individual.

The above definition must be considered a general working approach for those who have requested it. Educational Technology is a process whose product is learning. Presenting a concise and brief definition would be similar to defining the chemical/physical process involved in the production of rayon.

A full definition will represent the content of a major portion of the Set II material.

PROJECT PROGRESS

Set I - All of the initial scripts and visual specifications have been finished and initially validated with individual supervisors. Revised scripts and a more finished form of artwork are in preparation and should be complete within three weeks. The criteria tests and implementation handbooks are being developed and have the same target date for completion.

Set II - Initial scripts are almost finished and initial storyboarding is in process. As soon as these are complete they will be given to a number of supervisors for first validation. Within five or six weeks the first revisions should be complete.

Sets III and IV are both in the process of being specified and specific objectives (behavioral) are being revised. Scripting should begin within two weeks.

Support Materials are being identified. A crew of graduate students have been searching, reading and abstracting reports, catalogs, and research in every area that might provide support to the program.

THIS PROJECT IS FUNDED UNDER A RESEARCH GRANT FROM THE DEPARTMENT OF HEALTH, EDUCATION AND WELFARE - OFFICE OF EDUCATION.
TITLE IV - PROJECT #8-0427

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PROJECT ADMINISTRATOR

GEORGE H. ZIENER
National Science Teachers Assoc.

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Educational Technology Project

The NSTA Educational Technology Project is developing instructional packages for use with science supervisors. These instructional units are grouped into four areas or sets of packages: a) Role of a Science Supervisor, b) Introduction to Educational Technology, c) Application of Educational Technology, and d) Management.

Although the design of the entire project is to develop skills for the understanding and implementation of Educational Technology in various supervisory areas, the material has wider application. Each package within a set is a self-contained unit. As a result material can be utilized on a local level by supervisors for inservice development programs and administrative briefings.

All of the Set I and half of the Set II packages have been completed and are presently being reviewed by both supervisors and teachers. The results of these activities will provide the basis for revision and final production of materials.

The project issues a periodic Continuing Progress Report which contains a feedback mailer used to allow anyone interested to respond and to participate in project activity. Copies of this report are free and may be obtained by writing or calling the project office: George H. Ziener, Project Administrator, NSTA, 1201 Sixteenth St., Washington, D.C. 20036.

ED TECH PROJECT IS OVER; TWO WORKSHOPS HELD

The Educational Technology Project, which NSTA conducted during the past two years, will terminate February 28. Materials have been produced which relate to problems faced by the science supervisor: his duties and how to plan his work effectively, the nature of educational technology and its purpose in education, how educational technology can be applied to the supervisor's problems, and a simulated problem where the supervisor actually applies the principles to analyze his most important projects.

Two workshops have been held with science supervisors to review the NSTA educational technology materials and make suggestions for future use. The first workshop, in Palm Beach, Florida, on December 1-5, attracted 16 supervisors from various regions of the state. Florida State Science Supervisor James A. Moore arranged the meeting.

In Carlisle, Pennsylvania, the site of the second workshop, a small group of supervisors reviewed the educational technology material and visited the Dickinson College observatory and planetarium. The workshop, which also included a demonstration of computer programing via telephone, was arranged by James McDermott, a science consultant for Pennsylvania.

As the Educational Technology Project nears completion, NSTA is considering the next steps in finding ways to make the materials that have been developed available to a wide audience of supervisors and others involved in curriculum change.

APPENDIX C

RESPONSE SUMMARIES ON PROGRESS REPORTS

The responses to the first Continuing Progress Report totaled 85. Samples of some of the feedback received are included in the following pages. In general, response was favorable toward the project and either neutral or negative toward the format and presentation in the progress report.

Statistical Report

Number of replies:	85
Number of comments listed in this report:	32
Number of additional people interested in doing some evaluation work:	28

COMMENTS OF PERSONS RESPONDING TO THE FIRST PROGRESS REPORT

A. FAVORABLE

Sounds good. Where can I obtain a copy of your original proposal or other document that describes more precisely the kinds of Educational Technology to be employed. From my vantage point it appears that the local "science supervisor" role varies from that of being a traveling science teacher to that of "director of science" with major administrative responsibilities. I hope this project effort will meet the needs of this diverse group.

Larry McKown, Science Consultant
Battle Creek Public Schools
Battle Creek, Mich. 49017

This looks like a very useful research study. One that could be of use to new supervisors. I would like to review in more detail the plan part of the program. Thank you for informing me.

Edward J. Flannery, Science Supervisor
Council Bluffs Public Schools
207 Scott Bluffs, Iowa 51501

Your project sounds tremendously exciting and I should very much like to participate. I am currently developing Audio-Tutorial Systems in biology and am keenly interested in educational technology.

Mrs. Jane Abbott
Science Department Chairman
Waterville High School
Waterville, Maine 04901

Would be very much interested in purchasing copies of report when available. Please keep me informed.

James K. Montague
619 Washington Street #5
Coventry, Rhode Island 02816

I am definitely interested and wish to participate in the continuing reports. If Set B and Objectives 2 and 3 together mean that this project should develop insights and skills which will enable the supervisors to maintain flexibility and enable him to change with altering conditions so he can hopefully attack and solve new problems or incorporate new techniques, then I feel the project goal is worthwhile. I do not feel a development of solutions to presently known problems would have any long-term values. This latter approach would make the project self-perpetuating.

William R. Peterson, Science Supervisor
2206 Grandview Blvd.
Sioux City, Iowa 51104

As I read about the project it sounds great, but, I always end up wondering just what you mean by "Science Supervisor". I taught science in the mid-west for 10 years, there we considered the state department men and the college specialists as the "Science Supervisors". Now here in Mass. we have a state association of science supervisors - in reality it is made up of high school science department chairman and interested college science educators. Perhaps there are other kinds of science supervisors - who are you aiming at with these materials???

Dr. Donald Schmidt, Biology Dept.
Fitchburg State College
Fitchburg, Mass. 01420

An excellent idea that should prove beneficial to both myself and to the department. A clearer definition of "Educational Technology" should be provided. What is the cost? Who is to bear the cost? How many tests? How often are tests administered? How much time will be required of each participant? I am willing to participate.

Mr. Edward Thompson
Coordinator of Science
Board of Education
City Hall
Elizabeth, New Jersey

Reaction to the project - great. I want to be certain that I remain in contact as it progresses. Will be quite happy to react as it goes along.

Anthony Bleecker
Dean of Science Instruction
Pennsbury School District
Fallsington, Penna. 19054

Is there to be a questionnaire requesting opinions on the various points? Or how is the information and the necessary conclusion(s) to be decided? What is the definition of the science supervisor for the purpose of this study? Does it include department heads, chairmen, consultants, etc.?

Edmund F. Frankowski
Mather Junior High School
Darien, Conn. 06820

This is a much needed project, and I shall be interested in receiving all subsequent issues of reports on it. I agree that science supervisors must be aware of the applications of Educational Technology, because it is certainly one answer to some of the major problems in education today.

Mrs. Shirley Brewer
Coordinator of Secondary Science
Spring Branch I.S.D.
955 Campbell Road
Houston, Texas 77024

I am looking forward to receiving the next "issue" of these reports. It looks to me like you have a good thing going. I wonder what role I can play, what contribution I can make.

David Engleson
Department of Public Instruction
126 Langoon Street
Madison, Wisconsin 53172

I am most heartened by your recent proposal aimed at solving present or potential problems of the science supervisors. I would be most pleased to become a member of your project and would welcome any opportunity to assist in any way possible. Certainly the area of science supervision is a complex one with its varied disciplines and laboratory techniques, and, in many ways one of the most demanding positions in the public school setting. I look forward to continued correspondence.

Thomas W. Eastman
Director of Science
58 Hawthorn Avenue
Needham, Mass. 02192

The objectives sound great!! Exactly what do you mean by "self-instructional packages"? There seems to be a need for such a program. In defining the role of the science supervisor; at what level? State? District? Local? (Department Head?) Who is doing the identifying?

J. A. Moore
Consultant - Science Education
Department of Education
Tallahassee, Florida 32304

I will be very interested in the progress of this project. It covers an area which is of prime importance at this particular time in view of the rapid changes which are occuring in science education. If there is anything we here in this school system can do to assist the project, please feel free to call on us. I will be most happy to help any way I can on an individual basis.

J. B. Tuck
Science Supervisor
Bolivar Public Schools
Bolivar, Missouri 65613

I am interested in the Project in Educational Technology. Due to the increasing cost of education and the shortage of teaching plus the needs for individualization the project is highly pertinent. We hope to be included in your distribution.

John Manspeaker
Supervisor of Science
Charles County Board of Education
La Plata, Maryland 20646

An excellent and needed program. On the basis of the wide variety of assignments in K - 12, and the segmented units of responsibilities, this could be a rather extensive program. I sincerely hope that the format for "Feedback" is such that the respondent can conveniently place it in a typewriter so the tabulator of information does not have to read handwriting as bad as or even more like an M.D.'s than mine.

E. Stanley Melick
Science Department Head
Shaker Heights Senior High School
15911 Aldersyde Drive
Shaker Heights, Ohio 44120

The basic idea is a good one and I am pleased that you are working on it. Please send me copies of future reports.

Glenn D. Berkheimer
2208 Heritage Avenue
Briarwood
Okemos, Michigan 48864

This project will be followed willingly and closely. Thank you. Your first objective, if met, will give greater impetus to science supervisors whose role definition is anything but clear in some instances. I feel the advent of the non-graded approach and other innovative procedures in the total educative endeavor has created a need for knowledge of these methods and materials, sources of information, etc. on the part of supervisors which it is very difficult for them to obtain - given the fact that many are occupied on a full time basis. Perhaps it is a worthless suggestion but I know that it is almost impossible to obtain grants for supervisory institutes for elementary science supervisors. Is there some way in which technology can improve this situation? How synonymous are these terms: (in regard to science educators?) Specialists, Coordinator, Consultant, Supervisor, Teacher. A questionnaire would perhaps reveal some startling news. Thank you again.

Sister James Helena Nadeau
Science Supervisor, Title I Enrichment
  Project
160 Seabury Street
Fall River, Mass. 02720

An excellent design for meeting a rather obvious need.

David H. Ashby
Science Supervisor
3210 Campus Drive
Dayton, Ohio 45406

An ambitious and a necessary project. I am excited at the possible outcomes. I would hope that more information and detail would be made available soon. I volunteer to do anything I can do to help.

K. G. Campbell
Science Department Chairman
West Morris High School
Chester, New Jersey 07930

Please include me to receive future reports. At this point I feel so far behind in applications of Educational Technology to supervising that I haven't anything to feedback. Will try to improve as materials arrive and can be digested.

Dr. H. C. Donohoe
Chairman, Biology
Mercer County Community College
Trenton, New Jersey

Comment on role of the Science Supervisor in Iowa Intermediate Units (RESA) Regional Educational Service Agency. As a Science Consultant (not Supervisor), I see myself providing the following services to the 9 school districts in our merged County area: a) Promote in-service workshops. b) Share information concerning material, methods and programs. c) Assist with the articulation and development of K-12 Programs. d) Assist in developing resource units. e) Promote curriculum implementation and Research for professional, exemplary curriculum practices. g) Evaluate Instructional equipment and material. h) Investigate and assess major issues and trends in Science Education. i) Assist professional personnel, identify problem areas and suggest alternative proposals for solutions. My goal is to assist professionals in our local school districts, provide QUALITY Science Education for all students. I attempt to provide the leadership role so necessary for the developing and maintaining of a top-flight science program. I feel that my particular position is unique and a "step into the future" in dealing with Educational Services. Utilizing the merged area concept, quality assistance can be as available to the smaller school district and as effective with the larger districts. I will forward a brochure describing our school district and my particular department.

Joe R. Moore
Science Consultant
330 E. 4th Street
Area 1X 1MC
Davenport, Iowa 52801

This appears to be a very ambitious but useful project and I would like to be informed on the progress of the project. Do you have any collateral readings or specific references which might give me a better basis for understanding the nature of the project?

Joseph F. Walsh, Jr.
270 North Main Street
Cohasset, Mass. 02025
Science Supervisor

B. OPPOSED TO FORMAT OF PROGRESS REPORT

Please omit the jargon, i.e. whats a module, PERT, packages, etc.. Don't turn me off because I don't read your lingo. Now "what outcomes are desired and how they can be measured" - is plain talk for a great void in our business - fancy talk really doesn't impress people who work at this. To involve supervisors in extending their influence seems a worthwhile end to pursue - if other educational ends (non-science) are kept in focus. If the supervisor "interacts" with Ed Technology "applications" I read that I become involved in taking a look at something I'm doing - yet there is interaction between me and someone else - who? Final comment...When do I find time to become involved in this? Summers? I am a Jr. High chairman, a degree candidate, a father of 2, teach 3 classes and supervise 7 teachers. It's difficult for me to underatand HOW you are doing what seems to be a need thing.

David I. Kronenberg
156 - 11 Aguilar Avenue
Flushing, New York 11307

Perhaps this first Progress Report is deliberately vague. How do you define educational technology for the purposes of this project? Perhaps this would help me. If we are to effect change from the "research" phase through to dissemination in less than the usual fifty years, this project should be most valuable. Best wishes for your success. Call on me, please, if I can be helpful.

Max Berzofsky
Science Department Chairman
Loch Raven Jr. High
8101 LaSalle Road
Towson, Maryland 21204

Sorry, this material is almost obsolete in terms of observable behaviors. Cannot react in any meaningful way.

John G. Read
Science Supervisor
17 Chestnut Street
Sharon, Mass. 02067

So you want Feedback. Well, here's some. Just what kind of feedback did you want on Report #1? You failed to identify the immediate action, behavior, or performance you wanted at this point. Either you failed to analyze the first feedback loop in this project and include proper input into it, or you outdid yourselves in your analysis anticipating just this type of reaction. I am not certain whether you wanted any feedback or not. But if you wanted feedback, on what did you want it? Do you want overall reactions? Do you want a reaction to the Purpose? (I highly doubt that since it was probably stated in the grant proposal and is not likely to be alterable under any circumstances until later in the project.) Do you want reaction to the Objectives? (I doubt that also for the same reason.) Or do you want comments on the Plan? (I doubt that also as it would be nonsense to alter it before it is undertaken.) Or do you want help at this point on step one? In the absence of specific behavioral programming, I will react generally, and say the project is needed and I want to be a part of it; so keep me on the mailing list. I hope my above analysis is not too harassing and may provide you with a lighter moment during your tracking of sub-sub-system no. 1 That at least, is its intent. I will try to be more helpful on interaction of No. 2.

Jerry M. Colglazier
925 S. Pasadena Street
Indianapolis, Indiana 46219

The covering letter mentions that "the outcomes" of the project should be very useful to science supervisors, but nowhere does the booklet tell us exactly what those outcomes are or will be. What are "science education personnel?" ...students? teachers? supervisors? textbook writers? media developers? administrators? The term is too vague. Be specific. What needs? Again it would help if you were specific. Is a module a package? Why not choose a name and stick with it? What do these materials look like? Booklets? Micro-fiche? Films? Will they be some sort of programmed material? It would help if you were more specific. Does "specifically stated objectives" mean behavioral objectives? The objectives listed below are not of much use. They are not stated in behavioral terms and much too vague. It might be a good idea if you asked science supervisors what the objectives ought to be. What do they need most? Should I assume that 1) refers to Set A, 2) refers to Set B, etc.? If not, what does the "functions" in 2) refer to? Those mentioned in Set A or those in Set B? or to some other functions? Objective 1) sound like a waste of time, but of course it is so vaguely stated that I am not really sure what is meant. It sounds like something we have all met in most of our deadly dull education courses. Objective 2) sounds like it might be more interesting and useful, if only I knew what functions you were talking about. Objectives 3) and 4) sound great. Something like this is really needed. The plan

Continued next page

Since some of the pedagese used thruout this brochure has been translated via parenthetical statements, a definition of Educational Technology is necessary.

H. Lloyd Burghart
Science Supervisor
Wainwright Street
Ipswich, Mass. 01938

It appears that this may develop into a valuable service for supervisors. I trust that it will be concise, meaningful, and will change behavior.

George N. Cataldo
Science Supervisor
138 Walworth Road
Ontario, New York 14519

Might not Set B and C precede Set A, so that the contemporary theory and application could be used in problem identification?

Dr. Clarence W. Gehris
Dept. of Biological Sciences
State University College
Brockport, New York 14420

I don't understand everything you have written here. Will it be clarified? If your objectives are reached, and I can be a better supervisor through using the materials which are developed, I'm all for it. Count me in.

Lawrence J. Buford
Science Supervisor
6518 Laird Drive
Austin, Texas 78757

I am interested in receiving reports of this project as it progresses. You have not indicated the charge for these reports. Will a subsequent issue contain this information?

Mrs Catharine Y. Bonney
Science Supervisor
Newark Special School District Box 360
Newark, Delaware 19711

The responses to the second Continuing Progress Report totaled 350. Samples of some of the feedback are shown on the following pages. In general, the response to both the project, its activities, and the report ranged from favorable to enthusiastic.

Statistical Report

Number of replies:	350
Number of comments listed in this report:	32
Number of additional people interested in doing some evaluation work:	185

COMMENTS OF PERSONS RESPONDING TO THE SECOND PROGRESS REPORT

Your second report must be commended for its organization and simplicity. The first report left me a little cold, perhaps because I thought that this project looked like one of the typical ones that might never get off the ground and probably would be of little value to many. I am happy to see that you are moving so rapidly on the project. Keep up the good work. I'll be interested in seeing the first Set.

Lloyd H. Lundberg
Assistant Principal
Proviso Fast High School
Elmhurst, Illinois 60126

In my role as a consultant to the many school districts which participate in ERCA I encounter many of the problems which the Educational Technology Project was designed to clarify. I would be most anxious to see if either of these two sets could ease any burden with the supervisors in council schools and of course be delighted to provide feedback information for the project.

Fred Rasmussen
Research Associate
Educational Research Council
of America
Rockefeller Building
Cleveland, Ohio 44113

Are any of the materials available to us now? If so, please send Set I materials. They would prove helpful in reevaluating my role in the local organizational structure.

Marjorie M. King (Miss)
Science Consultant
Jefferson Parish School Board
519 Huey P. Long Avenue
Gretna, La. 70053

On August 30th I shall be moving to the University of Southern Mississippi at Hattiesburg to become an Assistant Professor of Science Education. There we shall be in an ideal position to conduct some evaluation work. Science Supervisors are new to the State of Mississippi. Until recently, I was the only science supervisor in the entire state; therefore, there needs to be a massive influx of information on the role of the supervisor. Your project can be the agency that does just that, and we need all the help possible. The University of Southern Mississippi has the only Department of Science Education in Mississippi and this institution is doing much to promote science education in this area. We shall be in a strategic position to conduct some of the research for the Educational Technology Project.

Dr. Bob E. Craven
Supervisor of Science
Leflore County School District
Route 1, Box 204
Greenwood, Miss. 38930

Some of my students are "beginning" science supervisors and/or administrators. I would like to try materials with this group. Also a new college course in Elementary School Science Supervision is currently developing and would like to evaluate Sets with this group as pre and in-service program.

John H. Settlage
Professor of Science Education
N.M.S.C.
Kirksville, Miss. 63501

I am the president of the Association of Science Department Heads of Eastern Massachusetts. If we, as a group, can be of any help to you, I wish you would inform me as to how we can aid you. We meet ten times a year starting in September. The Association consists of 28 supervisors of science. Some of our members are Department Heads of High Schools, others are Directors of Science from K-12. All our members have supervisory duties ranging from K-12, 7-12 to 9-12. I hope we will be able to assist you in some manner.

Samuel F. Gregory
Director of Science
Stoughton Public Schools
232 Pearl Street
Stoughton, Mass. 02072

The University of Wisconsin-Green Bay is making full use of educational technology where appropriate and where possible. We plan to include in our teacher preparation program instruction appropriate to develop competencies for the wise utilization for the usual instructional aids and the computer as a management tool. This latter area has particular relevance to area schools and would be the basis for a very strong research project. Specifically, we would like to investigate techniques whereby achievement in the sciences can be systematically monitored by the classroom teacher and the resultant data cataloged by computer. The creative aspect comes in the analysis of these data when various diagnostic statements can be produced for the teacher, to keep her alert to strengths and weaknesses in achievement for each student in her class. We hope to see a project of this sort develop, and hope to obtain some sort of funding within the next year.

Dr. George T. O'Hearn
Chairman, Division of Education
University of Wisconsin-Green Bay
1567 Dackner Avenue
Green Bay, Wisconsin 54302

We are principally a teacher-educating institution. At the present time we are involved in an NSF-COSIP Project aimed at improving our preparations of science teachers, primarily for the secondary schools. I am director of this modest Project, and would be glad to share with you any appropriate over-lap.

Dr. Charles E. Walker
Chairman, Division of Science & Math
Valley City State College
Valley City, North Dakota 53072

Continuing Progress Report #2 certainly brought this whole project into sharp focus and it's aims are realistic-Very. Whatever I can do to further the project I am willing to try. The developed "Sets" that will be developed could be of value. Presently, I am conducting a summer workshop using "Guide for Inservice Instruction" by AAAS for "Science - A Process Approach" and find that introducing "The Process Approach" by actually having teachers "DO" the exercises provides meaningful and lasting sessions. Hopefully, the Educational Technology Project would turn to teacher involvement approaches.

Dr. Robert D. Littlefield
Science Curriculum Coordinator
Oxford Hills High School
Main Street
South Paris, Maine 04281

The brief explanations and definitions are much appreciated. Further development in depth will throw more light on the project for those receiving the C.P.R. I wonder whether persons in the Science Supervisor/Consultant category may in their own minds think that they are fairly-well-versed in the aspects of Sets I, II, III, IV. From another point of view, however, well-planned "packages" can be most useful for ready reference and ready use with professionals under the supervision of the Supervisor/Consultant. Good luck in this Project.

Robert N. Nelson
Chairman Secondary Science
West Islip Public Schools
40 Alinda Avenue
West Islip, N.Y. 11795

I am also a part-time Educational Consultant to some Hospitals for in-service programs and am very interested in your Set II - Set III. For many reasons there has been a tremendous lag of "modern" educational methods, etc. and filtering into the medical field. I have been to several regional meetings, the work-shop in Las Vegas on Behavioral Objectives and continually share all the material with my teaching colleagues.

Dr. Mary E. Heatherman
Biological Consultant
San Francisco College for Women
2002-36th Avenue
San Francisco, Calif. 94116

It seems your Set I materials would be beneficial to me in program planning for this fall. I don't know if your methods include using university level supervisors in pre-service teacher training courses, but at any rate, I still am most interested in the materials for self-educational purposes.

Vince Mahoney
Science Supervisor
University of California
School of Education
Berkeley, Calif. 94720

How can a person get involved, trial and evaluation, only? Are you considering a set on Computer Based Instruction or Computer Assisted Instruction using teletype terminals and a shared time program?

Norbert J. Konzal
Science Consultant
Phoenix Union High School System
2839 W. Solono Drive N.
Phoenix, Arizona 85017

Thank you for making Report #2 more readable. The "pedantic jargon" of the first report left me cold. Now I have a better "feel" for what you are trying to do. It might be of interest to know your tentative time schedule. Is this a five year project? Two year? Continuing indefinitely?

Robert G. Gorton
Science Coordinator
New Providence High School
New Providence, N.J. 07974

Report No. 2 was more intelligible than No. 1. Thank goodness! Keep it clear and intelligible. To reach a meaningful audience the material must make sense to the un-initiated. When and how may the Sets be seen and studied?

Nicholas Sturm
Biology Department
Youngstown State University
140 Baldwin
Youngstown, Ohio 44505

So far it seems that this project is geared to the High School level. I would like to see and hear more about collegiate feed-back - if any.

Miss Patricia Grzybek
Villa Maria College
240 Pine Ridge Road
Buffalo, New York 14225

This project fascinates me. The explanations in your "progress reports" are confusing and written in such language that I still can't determine what it is all about. The elapsed time (January to July) of reports is so long that I forget about the project. I could find nothing in the NSTA annual convention program at Dallas about this project and could find no one who knew anything about it. I wish that just one "progress report" would state in simple language what you plan to do and how you plan to do it -- something concrete. Keep me posted.

Lawrence Buford
Coordinator - Secondary Science
Austin Independent School District
6100 N. Guadolupe
Austin, Texas 78752

The first page and one half of the Progress Report No. 2 was redundant and had much 'pedantic jargon'. The last two and one half pages were specific and to the point.

Edward L. Frazier
Chairman, Biological Science Dept.
Speedway High School
5007 W 14th Street
Speedway, Indiana 46224

The information in the Continuing Progress Report No. 2 was essentially a vague series of catagorical statements. One has no idea of the content or significance of what is being done. Hope the next report will be more specific and informative.

Dr. John C. Harnett
Chairman, Biology Department
St. Michael's College
Winooski, Vermont 05404

Definition of "educational technology" is weak. The part about it's being a "process approach to learning" is confusing. "Process" in science education, usually denotes a factor among the processes of science. Do you mean "active" or "involvement of individual"?

Victor Showalter
Research Associate
Educational Research Council
Rockefeller Building
Cleveland, Ohio 44113

Educational Technology Project as described could have a very direct impact upon students. A learning system is a goal of all science supervisors. Is the goal of the project to provide a framework that the supervisor can use to develop a learning system? Is the project designed to increase science supervision instructional development activities? Is the project itself a model system?

Stephen Rituper, Jr.
Curriculum Coordinator
Bethlehem Area School District
1330 Church Street - Education Center
Bethlehem, Penna. 18015

I hope I understand correctly from your Progress Report #2 that the packaged set materials after they have been initially tried and evaluated will be available to people on the project mailing list. I am looking forward to receiving the first package of these materials.

Robert J. Lexow
Associate Dean, Science & Math
Milwaukee Area Technical College
16760 Burleigh Place
Brookfield, Wisconsin 53005

Carry over into the college relations committee of NSTA looks good! Many college science department heads and Deans could well benefit from these packets. College instructors in General Education Science courses could benefit from evaluation of course objectives, since these courses provide training for elementary education majors.

Glenn H. Crumb
Kansas State Teachers College
Research & Grants Center
Emporia, Kansas 66801

This appears to fit in very well with a 5-year program we're developing with local school district cooperation, for elementary science personnel. Hopefully, with UPSTEP funding. An active, practical internship would be our core around which classes and laboratory would revolve after the first 2 years of liberal arts.

Dr. Clarence W. Gehris
Associate Professor
State University College
Brockport, N.Y. 14420

I am very interested in an involvement in this work you are doing. I am particularly interested in behavioral objectives you have indicated. We are working as usual on in-service training projects and curriculum evaluation and changing. Your work seems to be something which I can directly use to a great advantage.

Harry C. Hewett
Head, Science Department
Gallup High School
Boardman Avenue
Gallup, New Mexico 87301

Definition, limitation, and execution of duties of science supervision is long overdue. Each school board, administrator and supervisor has his own definition, etc. of what a supervisor is and how he should operate.

Robert L. Sampson
Head, Science Department
Central Grammar School
207 Granite Street
Rockport, Mass. 01966

The actual content of the materials included in each set is vague. Although all presons having anything to do with this area of science education have ideas and/or responsibilities having to do with their particular position your report is still vague as to what you would define as the role of the science supervisor. A more complete outline of the content of each "Set" would be most helpful. What you are attempting to accomplish is good and will prove vital to us in the field. It will fill a much needed gap.

Phillip A. Poppleton
Chairman, Science Department
Enumclaw Senior High School
Route 2 - Box 610
Enumclaw, Washington 98022

APPENDIX D

VALIDATION QUESTIONAIRES

There are three separate validation forms included in this appendix. These assessments were used in addition to the pre-post tests for the individual packages.

The first form was used with individual science supervisors on individual packages prior to the large group validations.

The second and third forms were used for the two large group validations that included all of the packages complete up to that time.

EDUCATIONAL TECHNOLOGY PROJECT

criterion assessments

FOR SINGLE PACKAGE EVALUATION: INDIVIDUAL VALIDATION

NATIONAL SCIENCE TEACHERS ASSOCIATION
1201 Sixteenth St., N.W., Washington, D.C. 20036

PRESENTATION QUESTIONAIRE

CONTENT:

1. Write (discuss) the content of the presentation you just received, including comment on the following specifics:
    - A. Amount - was there enough information, too much, not enough (too specific, too general)?
    - B. Organization - did the content follow a logical sequence, was it clear, was it confused?
    - C. Relevance - did it convey an understanding of your responsibilities as a science supervisor, was the information presented useful?

MEDIA:

1. Comment (write or discuss) the media of the presentation you just received with specific reference to the following:
    - A. Type (slide-tape) - would you use the same media in conveying the content, or other media? If you would use other media, for instance, videotape movie, what kind would you use?

B. Effectiveness - was the media used effective in conveying the content? Indicate points you thought most effective, least effective. Did the media used lend weight and impact to the content?

APPLICATION:

1. Evaluate the method used in this presentation including the following:
   A. The sequence of events - pre-test, post-test, media presentation, post presentation activities.
   B. How would you describe this presentation in talking with another science supervisor?
   C. What strengths and weaknesses would you point out in writing an annotated bibliography which included this package?
   D. Would you use this package to present the material to other science supervisors? Why or why not? What would be your expectations in using this package?
   E. Would you use this package to present the material to science teachers? Why or why not? What would be your expectations in using this package?

F. What additional material and/or activity would you add to increase the effectiveness of the package?

G. Indicate a few other methods you think would be equal or more effective in presenting this package?

Method Used:

The same procedure was used with each person although some of the questions differed depending on reactions. The draft of the presentation questionnaire was used as a discussion guide. Rather than tape the comments, which could easily have been done due to the equipment arrangement, notes were kept and these will be summarized by the material covered rather than individual interviewed.

A. Each person was separately briefed on the project: (Background, goals, activities)

B. The Applications Handbook for the Research Section was shown and discussed as an example of the approach being taken in packaging the modules. The term module was not used - it appears to be a rather useless 'jargonese' term. Instead, 'package' or 'instructional package' was used.

C. A statement as to the objectives of the package was given in lieu of an application handbook. The package was then presented without comment and the viewer given a few minutes to make notes and think about the presentation.

D. The package was then extensively discussed. No limit was placed on time and supervisors were encouraged to be both frank and honest.

EDUCATIONAL TECHNOLOGY PROJECT

criterion assessments

PRE/POST TEST FOR LARGE
GROUP VALIDATIONS

NATIONAL SCIENCE TEACHERS ASSOCIATION
1201 Sixteenth St., N.W., Washington, D.C. 20036

The following pages represent an attempt on the part of the project staff to determine some of your attitudes prior to the program. Put your name on the booklet and turn it in after you have completed it.

The responses entered here will provide much needed information if we are to improve the project material. Your honest reactions are vital if the project is to be successful. We have made every effort to keep the responses as brief as possible.

Complete this assessment before starting any of the project materials. At the end of the entire program, you will be given a second assessment. If you need more space at any time use the back of the page.

Mark any questions or comments you would like to have us answer in detail and we will respond.

Thank you for your help. It
will make things even better
for future participants.

VALIDATION QUESTIONNAIRE

I. Attitudes

A. Circle the number that indicates your attitude toward Educational Technology.

	Favorable	Mildly Favorable	Balanced	Mildly Favorable	Favorable	
1) Random Structure	2	1	0	1	2	System
2) Teaching	2	1	0	1	2	Learning
3) Objective Evaluation	2	1	0	1	2	Subjective Evaluation
4) Validated	2	1	0	1	2	Invalidated
5) Rigid	2	1	0	1	2	Adaptive
6) Process	2	1	0	1	2	Machines
7) Single Learning Source	2	1	0	1	2	Multiple Learning Source
8) Realistic	2	1	0	1	2	Unrealistic
9) Effective	2	1	0	1	2	Ineffective

B. Circle the number that indicates your attitude toward Behavioral Objectives.

1) Structured	2	1	0	1	2	Unstructured
2) Learner	2	1	0	1	2	Teacher
3) Criterion Tests	2	1	0	1	2	Norm-Referenced Tests
4) Objective Evaluation	2	1	0	1	2	Subjective Evaluation
5) Affective	2	1	0	1	2	Cognitive
6) Effective	2	1	0	1	2	Ineffective
7) Group	2	1	0	1	2	Individual
8) Help	2	1	0	1	2	Hindrance

C. Circle the number that indicates your attitude toward Scientific Literacy.

1)	Vague	2	1	0	1	2	Well Defined
2)	Effective	2	1	0	1	2	Ineffective
3)	Pure Science	2	1	0	1	2	Technology
4)	Facts	2	1	0	1	2	Ideas
5)	Suitable	2	1	0	1	2	Unsuitable
6)	Applications	2	1	0	1	2	Theory
7)	Unwise	2	1	0	1	2	Wise
8)	Exploiting	2	1	0	1	2	Conserving
9)	Attitudes	2	1	0	1	2	Knowledge
10)	Society	2	1	0	1	2	Individual

D. Circle the number that indicates how you feel about your role as Science Supervisor.

1)	Difficult	2	1	0	1	2	Easy
2)	Well Defined	2	1	0	1	2	Vague
3)	Informed	2	1	0	1	2	Ignorant
4)	Professional	2	1	0	1	2	Political
5)	Rigid	2	1	0	1	2	Flexible
6)	Rewarding	2	1	0	1	2	Frustrating
7)	Unimaginative	2	1	0	1	2	Creative
8)	Status Quo	2	1	0	1	2	Change
9)	Challenging	2	1	0	1	2	Routine
10)	Sad	2	1	0	1	2	Happy

E. Circle the number that indicates how you feel about Science.

1)	Facts	2	1	0	1	2	Concepts
2)	Outcomes	2	1	0	1	2	Discoveries
3)	Philosophy	2	1	0	1	2	Action
4)	Society	2	1	0	1	2	Individual
5)	Personal	2	1	0	1	2	Impersonal
6)	Disciplines	2	1	0	1	2	Humanism
7)	Uncertain	2	1	0	1	2	Established
8)	Amoral	2	1	0	1	2	Moral
9)	Routine	2	1	0	1	2	Creative

II. A. What are your interests as a supervisor?

B. What do you feel are your major skills?

C. What do you feel are your major deficiencies?

III. Indicate how you feel about your knowledge and skills as a supervisor in the following areas and whether you feel that it is a necessary area of interest for the Science Supervisor.

	Adequate	Inadequate	Necessary	Unnecessary
1) Public Relations				
2) Personnel				
3) Management				
4) Curriculum Development				
5) Media Equipment				
6) Budgeting				
7) Inventory				
8) Inservice Training				
9) Systems Applications				
10) Individualized Applications				
11) Educational Technology				
12) Evaluation of Teachers				

III. Continued.

		Adequate	Inadequate	Necessary	Unnecessary
13)	Evaluation of Curriculum				
14)	Report Preparation				
15)	Laboratory Equipment				
16)	Unions				
17)	Science Fairs				
18)	Student Assessment				
19)	National Science Education Programs				
20)	Scientific Literacy				

SINGLE PACKAGE VALIDATION*

NAME OF PACKAGE ______________________

EDUCATIONAL TECHNOLOGY PROJECT EVALUATION

1. Would these materials be worthwhile for each of the following groups? Rate probable value for each.

	VALUE					
	No Use	Low				High
Supervisors	0	1	2	3	4	5
Teachers	0	1	2	3	4	5
Administrators	0	1	2	3	4	5

2. Rate the quality of the presentation.

	QUALITY			
	Poor	Fair	Good	Excellent
Sound				
Photography				

3. Comment and General Impression: (Note here any special points as to authenticity, bias, or attitude: also a brief statement of how the material affects you.)

4. Is there any particular portion(s) of the visual or audio material you feel should be changed? (List and give reason)

5. If you had a copy of this material would you use it? How?

---

* One of these was given for each package presented.

APPENDIX E

VALIDATION SUMMARIES

Both of the large group validations were held outside of the Washington, D.C. area. In both cases the state paid almost all expenses for the science supervisors and the supervisors assumed any additional personal expenses. The project assumed the cost of facilities - if any - materials and operating staff.

LARGE GROUP VALIDATION HELD AT HOLIDAY INN, WEST PALM BEACH, FLORIDA, DECEMBER 1-5, 1969

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IMS Project
NOVA Educational Complex
Ft. Lauderdale, Florida 33314

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Supervisor of Science
Okaloosa County School Board
Bay Area Office
201 Marilyn Avenue
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H. W. (Dick) Berryman
Program Specialist I - Science
Palm Beach County School Board
3323 Belvedere Road
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In-Step AAAS Science
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Mrs. Mary Harbeck
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Educational Technology Project
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EVALUATION OF ATTITUDE TEST

	PRE-TEST					POST-TEST				
	2	1	0	1	2	2	1	0	1	2
A. Educational Technology										
1) Random Structure - System		1	2		2					5
2) Teaching - Learning *	2				2	5				
3) Objective Evaluation - Subjective Evaluation	2	2		1		5				
4) Validated - Invalidated	2	1		1	1	2	3			
5) Rigid - Adaptive	1	1			3				1	4
6) Process - Machines				2	3					5
7) Single Learning Source - Multiple Learning Source	1	1			3					5
8) Realistic - Unrealistic	3	1			1	4	1			
9) Effective - Ineffective	3	2				3	2			
B. Behavioral Objectives										
1) Structured - Unstructured	3	1		1		4		1		
2) Learner - Teacher	3	1		1		5				
3) Criterion Tests - Norm Referenced Tests	3	1	1			5				
4) Objective Evaluation - Subjective Evaluation	2	1	1	1		3	1			
5) Affective - Cognitive	1	1		1	2	1	1	1		
6) Effective - Ineffective	2	2	1			3	2			
7) Group - Individual	3	1		1		3	2			
8) Help - Hindrance	1	2		1	1	3	1	1		

* Indicates that someone did not answer a question.

	PRE-TEST					POST-TEST				
	2	1	0	1	2	2	1	0	1	2
C. Scientific Literacy										
1) Vague - Well Defined			1	3	1		2	1	1	1
2) Effective - Inefficient	1	3			1		4	1		
3) Pure Science - Technology		3	2					3	2	
4) Facts - Ideas	2	2		1		3	2			
5) Suitable - Unsuitable	2	2		1		3	2			
6) Applications - Theory		3	2			2	3			
7) Unwise - Wise				3	2				2	3
8) Exploiting - Conserving		1		3	1		1	1	1	2
9) Attitudes - Knowledge	1	3			1	3	2			
10) Society - Individual		1		4		1		3		1
D. Role of Science Supervisor										
1) Difficult - Easy		1	1	1	2			2		3
2) Well Defined - Vague		1	1		3		1		2	2
3) Informed - Ignorant		5				2	3			
4) Professional - Political	2	2			1	2	3			
5) Rigid - Flexible	1	2	1	1		1	3		1	
6) Rewarding - Frustrating		1	2	1	1	1	1	1	2	
7) Unimaginative - Creative					5			1	4	
8) Status Quo - Change					5	1			3	2
9) Challenging - Routine	1	2	2			2	2	1		
10) Sad - Happy			3	2				1	2	2

	PRE-TEST					POST-TEST				
	2	1	0	1	2	2	1	0	1	2
E. Role in Science										
1) Facts - Concepts				2	3				1	4
2) Outcomes - Discoveries	1				4	1	1	2		1
3) Philosophy - Action				3	2					5
4) Society - Individual	1		4			1		3		1
5) Personal - Impersonal	4	1				3	1	1		
6) Disciplines - Humanism		1			4		1	2	1	1
7) Uncertain - Established	1	1		3		1		2	1	1
8) Amoral - Moral	2	1	1	1		1	3		1	
9) Routine - Creative				4	1				1	4

II. A) What are your interests as a supervisor?

The answers changed little between the Pre and Post test. Most of the supervisors were interested in planning curriculum for the nonacademic student, inservice training and scientific literacy.

B) What do you feel are your major skills?

The majority stated inservice training and evaluation.

C) What do you feel are your major deficiencies?

Management and record keeping, difficulties in keeping up with the rapid changes in science, and public relations.

III. Because there was no way to show the degree of adequacy or inadequacy this portion cannot be evaluated too easily. The majority felt that they were inadequate in Public Relations, Management, Budgeting, Systems Applications, Individualized Instruction, Educational Technology and Scientific Literacy.

ANALYSIS OF EVALUATION SHEETS - FLORIDA WORKSHOP

SET I - CURRICULUM REVISION

1. Most participants rated this package to be of little to moderate use to any group, but one person gave it a high rating for both supervisors and administrators.

2. The tape section of the package was rated good in all instances. The photography, however, went from poor to excellent.

   Sound 1 Poor 6 Good 1 Excellent

   Photography 1 Poor 2 Fair 3 Good 1 Excellent

3. Most said the presentation was well done although one participant felt it was a good introduction to problems but gave no answers.

4. There were three comments to this question.
   a) Artwork does not do a good job of interpreting the script.
   b) Questions often not direct.
   c) More factual slides - fewer pretty colors.

5. Most said they would use a copy of this presentation with teachers and administrators but only one would use it with science supervisors.

ANALYSIS OF EVALUATION SHEETS - FLORIDA WORKSHOP

SET I - EVALUATION

1. A wide variation of the value of this package exists. Most rated it of medium value to supervisors, one rated it of high value to supervisors, and one comment ruled out any value to supervisors. Medium value to teachers and administration was representative of the participant reaction to this package.

2. The photography was acceptable by all. One participant reported the sound to be of excellent quality, however, two persons reported a need for accompanying sound. No valid assessment of sound can therefore be concluded.

Sound	1 Fair	1 Good	1 Excellent
Photography	5 Fair	2 Good	

3. Impressions varied from "nothing new" to "better than most." Other comments indicated that the questions are ever present; what is needed are answers or expertise in arriving at solutions, particularly in criterion assessment. One participant objected strongly to teacher evaluation.

Evaluation Continued

4. No comments.

5. Possible use of the materials would be with teachers and administration, and inservice department heads. Possibly some use to novice supervisors. One suggested it be used to defend the position of the science supervisor for those who knew nothing about it.

ANALYSIS OF EVALUATION SHEETS - FLORIDA WORKSHOP

SET I - MANAGEMENT

1. Overall opinion suggests it to be weighted in value to supervisors, but, of little use to teachers and administrators.

2. The sound and photography were of mediocre quality. No one found it to be either poor or excellent.

Sound	1	Fair	12	Good
Photography	5	Fair	8	Good

3. Comments varied, the majority being critical. Lack of depth and the level of content of material presented plus the speed of presentation were major objections.

4. The rapid pace of presentation is the outstanding drawback of this portion of the program.

5. Although apparent reception to the material as stated in the remarks, is negative in nature, 75% of the group would find it useful in the future.

ANALYSIS OF EVALUATION SHEETS - FLORIDA WORKSHOP

SET I - PUBLIC RELATIONS

1. The general opinion was that the material would be of value to supervisors, teachers and administrators.

2. The sound and photography apparently appealed to all participants.

Sound	1	Fair	10	Good	1	Excellent
Photography	4	Fair	6	Good	2	Excellent

3. Public Relations was well received. The content was absorbed by all and the one dissenting comment was that there should have been more written on the subject.

4. Accepted very well. Some remarks pertinent to minor corrections were made. Their tone suggests a need for minor changes in wording and slides but none are really critical.

5. Most would use this package to varying ends.

ANALYSIS OF EVALUATION SHEETS - FLORIDA WORKSHOP

SET I - RESEARCH

1. The group apparently feels this package would be of little value to supervisors, teachers, or supervisors.

2. The sound and photography was of medium quality, neither poor or outstanding.

Sound	5	Fair	6	Good
Photography	4	Fair	7	Good

3. Very critical. Opinions state: No depth, no content. The surface was scratched but never penetrated. The remarks seem to indicate that this is not new, and not for practicing supervisors.

4. The beeper continues to distract. The speed of presentation was too fast.

5. The utilization for further instruction is highly unlikely.

ANALYSIS OF EVALUATION SHEETS - FLORIDA WORKSHOP

SET II - TOWARD A DEFINITION

1. Only six evaluation reports were turned in. Two participants thought the material would be of high value to supervisors, teachers, and administrators. The other four responded to the opposite end of the spectrum indicating low value for all three categories.
2. The sound and photography were rated in the fair to good range.

   Sound 2 Fair 4 Good

   Photography 3 Fair 3 Good
3. The majority of the reports were incomplete. One participant liked the portion requiring the learner to make a decision and recommended the same technique be incorporated in other packages. Another felt the material was irrelevant to supervisors but acceptable for an introduction.
4. The majority of the reports were incomplete. One comment indicated a lack of "eye appeal" in this group of visuals. Another suggested the entire presentation be changed.
5. A general consensus indicated that this package would not be used by the participants.

ANALYSIS OF EVALUATION SHEETS - FLORIDA WORKSHOP

SET II - THE INDIVIDUAL LEARNER

Only three evaluation sheets were received. The comments on these indicate a favorable response to the material and its presentation.

ANALYSIS OF EVALUATION SHEETS - FLORIDA WORKSHOP

SET II - CLOSING THE LOOP

1. The value of this package ranges from high to low. Most feel it is of little use to supervisors but would have from moderate to high value to teachers and administrators.

2. Sound and photography both averaged a good rating.
   Sound 2 Fair 6 Good 1 Excellent
   Photography 1 Poor 1 Fair 5 Good 2 Excellent

3. Most participants felt it had value for teachers and administrators and PTA, but little use for supervisors.

4. The two areas which caused the most comment were the slides on bees - bees are highly organized, so slides should be changed - and some did not like the 'bolted down chairs.' Another person felt that some of the diagrams were very inappropriate.

5. Most said they would use it for teachers and PTA but only two participants felt it had any value for supervisors.

LARGE GROUP VALIDATION HELD AT DICKINSON COLLEGE, CARLISLE, PENNSYLVANIA, JANUARY 5-9, 1970

*John J. McDermott
State Department of Public Instruction
Harrisburg Penna.

*Carl Guerriero
State Department of Public Instruction
Harrisburg, Penna.

*William H. Bolles
State Department of Public Instruction
Harrisburg, Penna.

*Dr. Irvin T. Edgar
State Department of Public Instruction
Harrisburg, Penna.

*Joseph E. Anthony
State Department of Public Instruction
Harrisburg, Penna.

Carl E. Heilman
State Department of Public Instruction
Harrisburg, Penna.

*Lloyd Woods
Big Spring Science Department
Newville, Penna.

Martha Adams
Carlisle Area Science Department
Carlisle, Penna.

Arlene Guerriero
Carlisle Area Science Department
Carlisle, Penna.

*Daniel Wilker
North Schuylkill Science Department
Ashand, Penna.

*John Clifford
North Schuylkill Science Department
Ashand, Penna.

C. Arthur Kadel, Jr.
Cumberland Valley Science Department
Mechanicsburg, Penna.

*Albert Gunter
Shippensburg State College
Shippensburg, Penna.

Gary Bitner
Shippensburg State College
Shippensburg, Penna.

*Jay Davidson
Shippensburg State College
Shippensburg, Penna.

Dr. Benjamin James
Chairman of Education
Dickinson College
Harrisburg, Penna.

*Charles Beehler
Rosetree-Media Science Department
Media, Penna.

Dr. Gerald Hawkins
Dr. Gordan Stegink
Dr. Scott Smith
Dickinson College
Carlisle, Penna.

Dr. Albert F. Eiss
George H. Ziener
National Science Teachers Assoc.
Educational Technology Project
Washington, D.C.

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* Persons attended for the entire five days

EVALUATION OF ATTITUDE TEST

	PRE-TEST					POST-TEST				
	2	1	0	1	2	2	1	0	1	2
A. Educational Technology										
1) Random Structure - System				2	4					6
2) Teaching - Learning				3	3					6
3) Objective Evaluation - Subjective Evaluation	3	2		1		1	4	1		
4) Validated - Invalidated	2	3	1			6				
5) Rigid - Adaptive				3	3					6
6) Process - Machines	2	1		3		6				
7) Single Learning Source - Multiple Learning Source				1	5					6
8) Realistic - Unrealistic	4	1		1		6				
9) Effective - Ineffective	4	1		1		6				
B. Behavioral Objectives										
1) Structured - Unstructured	6					6				
2) Learner - Teacher	5	1				6				
3) Criterion Tests - Norm Referenced Tests	3	2		1		5	1			
4) Objective Evaluation - Subjective Evaluation	3	1		1		3	2	1		
5) Affective - Cognitive	2	1	1		2	1		4	1	
6) Effective - Ineffective	3	2	1			5	1			
7) Group - Individual			1	2	3			2	1	3
8) Help - Hindrance	5	1				5	1			

* Indicates that someone did not answer question.

	PRE-TEST					POST-TEST				
	2	1	0	1	2	2	1	0	1	2
C. Scientific Literacy										
1) Vague - Well Defined	1	1	1		3			1	2	3
2) Effective - Inefficient	2	2	1		1	2	4			
3) Pure Science - Technology	1		5					6		
4) Facts - Ideas			3	1	2			4	1	1
5) Suitable - Unsuitable	5	1				5	1			
6) Applications - Theory	1		4	1			1	5		
7) Unwise - Wise	1			1	4				2	4
8) Exploiting - Conserving		1		2	2			1	2	3
9) Attitudes - Knowledge	2	2	2			2	1	3		
10) Society - Individual		3	3			1	1	4		
D. Role of Science Supervisor										
1) Difficult - Easy	1		4	1		2	2	1	1	
2) Well Defined - Vague	1	3	1	1			4	1	1	
3) Informed - Ignorant	1	5				4	2			
4) Professional - Political	5	1				5	1			
5) Rigid - Flexible		1		2	3				2	4
6) Rewarding - Frustrating	3	3				4	1	1		
7) Unimaginative - Creative				2	4				2	4
8) Status Quo - Change				3	3				2	4
9) Challenging - Routine	3	3				5	1			
10) Sad - Happy				2	4				2	4

	PRE-TEST					POST-TEST				
	2	1	0	1	2	2	1	0	1	2
E. Role in Science										
1) Facts - Concepts			2	2	2			4	2	
2) Outcomes - Discoveries		1	2	2	1			3	3	
3) Philosophy - Action		1	4	1				4	2	
4) Society - Individual		3	3				1	4	1	
5) Personal - Impersonal	1	4	1			1	2	2	1	
6) Disciplines - Humanism		1	2	3			2	2	1	1
7) Uncertain - Established			1	3	2		1		2	3
8) Amoral - Moral			2	4			1	2	2	1
9) Routine - Creative			1	2	3				4	2

II. A) What are your interests as a supervisor?

The answers changed little between the Pre and Post test. Most of the supervisors were interested in planning curriculum for the nonacademic student, inservice training and scientific literacy.

B) What do you feel are your major skills?

The majority stated inservice training and evaluation.

C) What do you feel are your major deficiencies?

Management and record keeping, difficulties in keeping up with the rapid changes in science, and public relations.

III. Because there was no way to show the degree of adequacy or inadequacy this portion cannot be evaluated too easily. The majority felt that they were inadequate in Public Relations, Management, Budgeting, Systems Applications, Individualized Instruction, Educational Technology and Scientific Literacy.

ANALYSIS OF EVALUATION SHEETS - CARLISLE WORKSHOP

SET I - CURRICULUM REVISION

1. A high value rating was given for this package for Supervisors, Teachers and Administrators.

2. The sound portion of this presentation was given only a fair rating but the Photography portion averaged a good rating.

Sound	Fair 5	Good 2	Excellent 1
Photography	Fair 2	Good 5	

3. Six out of eight participants felt that the presentation was good and a very vital part of the program although a couple felt it should be followed up by methods of curriculum revision.

4. Listed below are some of the comments and suggestions for improving the slide/tape materials:

   Each set should have a title slide.

   It was hard to relate some slides to the tape.

   Ideas implied in drawings are not always apparent.

   Too much artwork; live photos are needed to relieve monotony.

5. Most said they would use this package with other supervisors, teachers, and administrators in in-service programs. One participant would use it in a supervisor workshop but felt it would not be applicable to teachers.

ANALYSIS OF EVALUATION SHEETS - CARLISLE WORKSHOP

SET I - EVALUATION

1. This package was rated of high use for supervisors, but of only moderate value for teachers and administrators.

2. It appears from the ratings that both the sound and photography in this presentation need considerable reworking.

   Sound Poor 4 Fair 2

   Photography Fair 4 Good 2

3. The general comment on this presentation seems to be a big question as to the role of the supervisor in evaluation and the instruments to be used in performing this task.

   Should objective evaluation criteris be set up for teachers?

   Should a supervisor evaluate teacher effectiveness?

   They feel that more information is needed on how to evaluate.

4. The majority felt the presentation moved too fast, the quality of sound on the tape was very uneven and that there was too much artwork and not enough live photography.

5. Most participants said they would use this package for all groups although one supervisor thought it to be the weakest package of the program and felt it only produced confusion.

ANALYSIS OF EVALUATION SHEETS - CARLISLE WORKSHOP

SET I - MANAGEMENT

1. Most participants felt this presentation to be of high value to supervisors, of moderate value to teachers, and varied from low to high for administrators.

2. Both sound and photography rated from Good to Excellent.

   Sound Good 4 Excellent 3

   Photography Poor 1 Fair 1 Good 3 Ex 2

3. Three people felt that the presentation moved too fast, however, all felt that the content was very good. One person said he was left with the question: "How do I handle it all?"

4. There were not too many comments to this question. One felt the slides could be of better quality and another did not see any reason for two projectors showing nothing but ? on slide.

5. The average opinion was one of usefulness to all groups.

ANALYSIS OF EVALUATION SHEETS - CARLISLE WORKSHOP

SET I - PUBLIC RELATIONS

1. High value ratings were given this package for use by superviso and administrators and a moderate value rating for teachers.

2. The sound portion ranged from good to excellent and the Photography was rated from fair to good.

   Sound Good 8 Excellent 2

   Photography Fair 3 Good 7 Excellent _____

3. The general impression was a very favorable one. Negative comments were that the presentation should be more specific and should go more into detail.

4. Some of the media comments are as follows:

   Cartoon element not specific for the purpose.

   Presentation needs more variety

   Artwork does not tell the story and should be redone.

5. Most participants would use the package for all groups.

ANALYSIS OF EVALUATION SHEETS - CARLISLE WORKSHOP

SET I - RESEARCH

1. Overall opinion suggests this package to be weighted in value to supervisors and administrators and of moderate use to teachers.

2. The sound portion was rated from good to excellent and the photography from fair to good.

   Sound Fair 1 Good 5 Excellent _____

   Photography Fair 4 Good 4

3. Two participants thought that specific references to specific science education journals would improve this program. Another felt that the slides were repeated too often. Two others thought it a very good and necessary presentation.

4. Some of the media comments are as follows:

   The slides move too fast for proper impact.
   Not strong enough on the topic of research.
   There are too many slides in places in the sequence without any script to accompany them.
   More live photography is needed.

5. The general opinion varies. Two participants would not use it at all, four would use it for administrators and supervisors, two felt it had teacher value, and three did not answer the question.

ANALYSIS OF EVALUATION SHEETS - CARLISLE WORKSHOP

SET II - TOWARD A DEFINITION

1. The value of this package was rated very high for Supervisors and moderately high for Teachers and Administrators.

2. The sound portion of this presentation was rated good but the majority rated the photography portion only fair.

   Sound Good 6 Excellent 1
   Photography Fair 5 Good 1 Excellent 1

3. All participants were in agreement that this presentation was well prepared and a necessary one. All felt it should have been shown before The Individual Learner and that both should be presented on the first day before anything else.

4. No comments were made here.

5. The responses to this question varied. Two didn't reply at all, one said he would not use it, and three said they would use it for all groups.

ANALYSIS OF EVALUATION SHEETS - CARLISLE WORKSHOP

SET II - THE INDIVIDUAL LEARNER

1. This presentation was rated very high for all three groups.

2. Both the sound and photography portions of this presentation were rated good.

   Sound Fair 1 Good 8 Excellent 3

   Photography Fair 4 Good 7 Excellent 1

3. The participants were unanimous in their feeling that this was an excellent presentation stressing the importance of individual differences as a learning factor.

4. The following are some of the changes that were suggested:

   Slides should be more uniform in density.

   The flow chart or instructional model was difficult to follow and suggested that a flow chart similar to those used by computer programmers might be better.

   Slide change was much too fast.

   The letters were too small on the model learning system.

   There was too much artwork and not enough real people.

5. Most agreed that they would use this package as part of a teacher inservice program. Others felt it would also be useful for other supervisors and for administrators.

ANALYSIS OF EVALUATION SHEETS - CARLISLE WORKSHOP

SET II - CLOSING THE LOOP

1. The value of this package was rated very high for all three groups.

2. Both sound and photography averaged a good rating.

   Sound Fair 1 Good 6 Excellent 1

   Photography Fair 2 Good 6 Excellent 1

3. All evaluators agreed that this package was very good. The material was tied together nicely and it got the message across in a direct and to the point manner. Most said that it should come earlier in the program. One participant would have liked more emphasis on the sequence dealing with what educational technology is not.

4. Most agreed that the visuals were the best in the series. They liked the use of actual pictures rather than artwork.

5. Most participants agreed that they would use this package with all groups.